Encroachment Effects on the Water Supply of Fort Gordon

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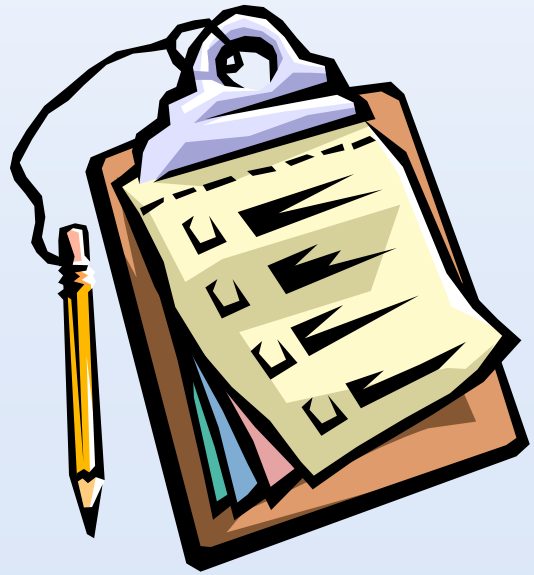
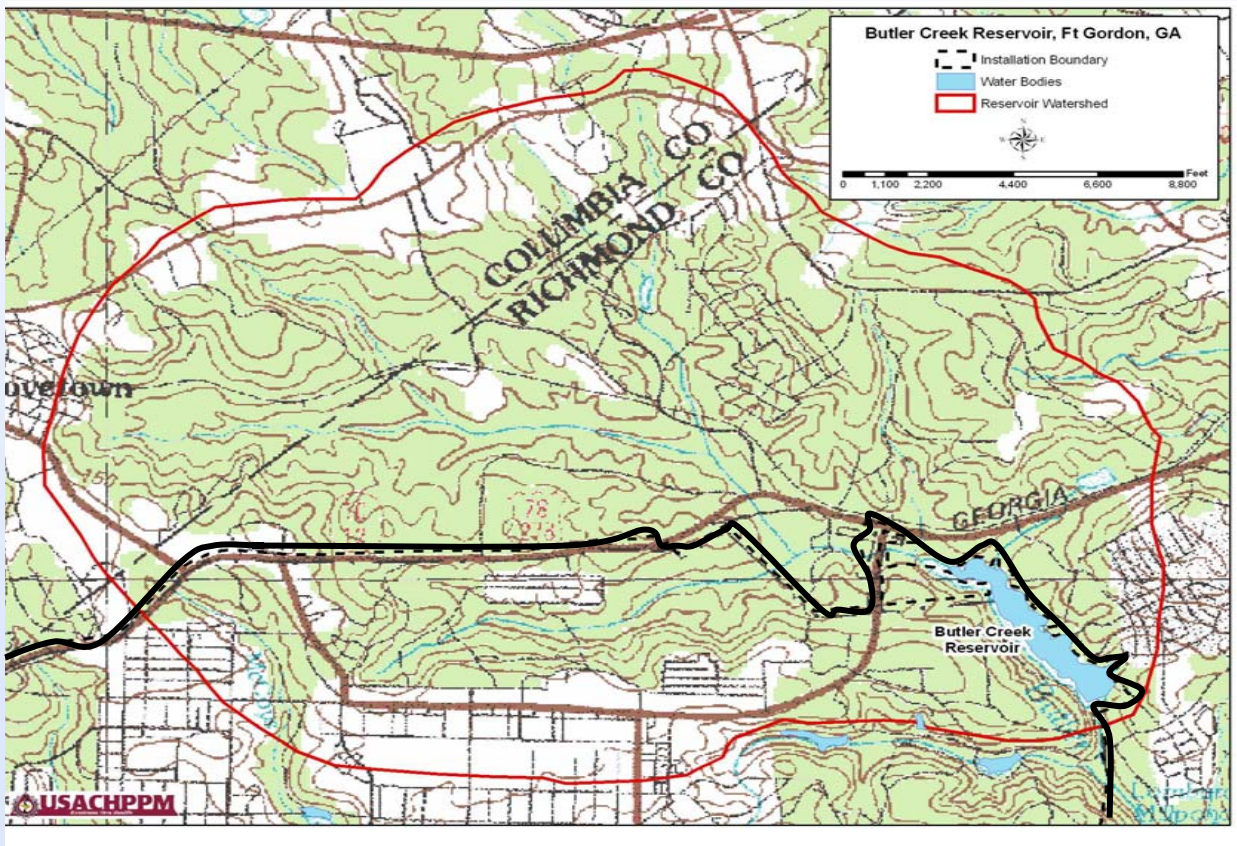
Overview

- Background
- Purpose
- Study Approach
- Results
- Conclusions/Recommendation



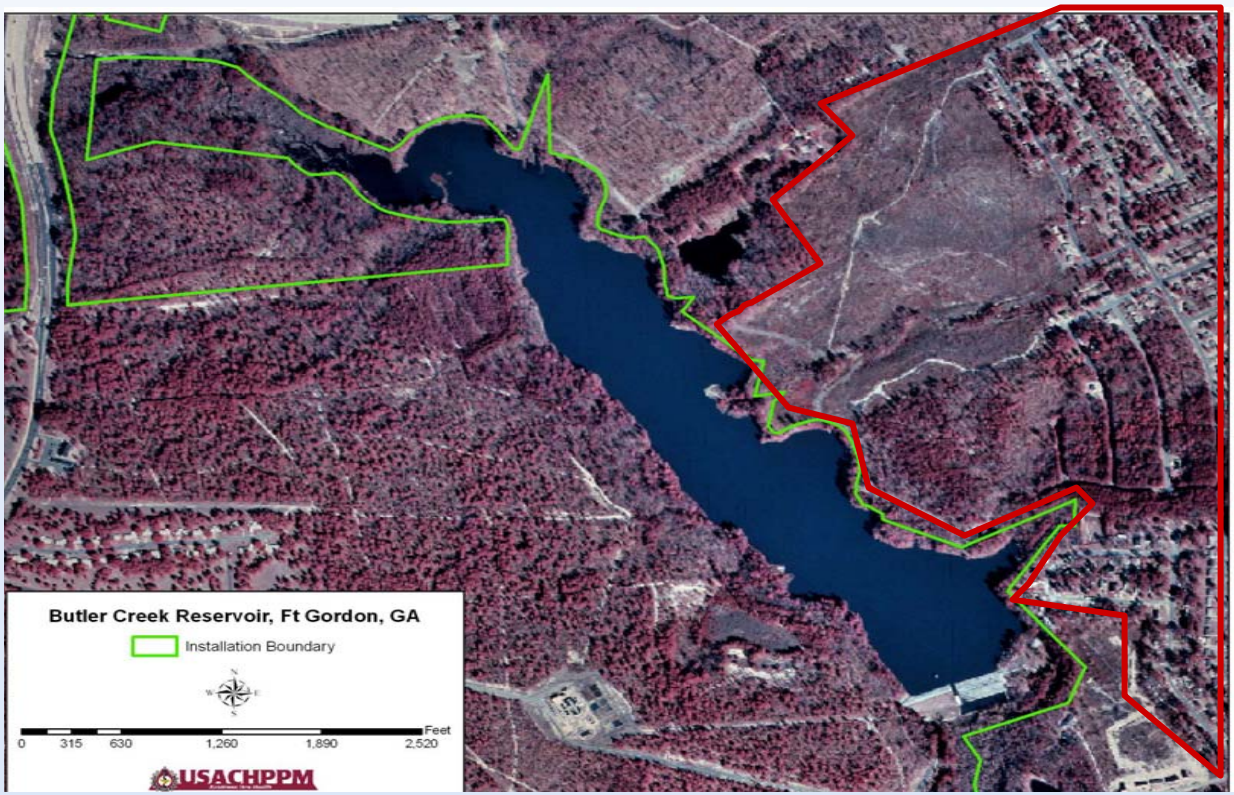
Butler Creek Reservoir (BCR) is the potable water supply for Fort Gordon

- Located approximately 5 miles west of Augusta, Ga.
- Watershed covers an area of 13.5 square miles



In 1978 a sedimentation and contamination study of BCR was conducted.

- Surface area = 88 acres
- Volume = 1100 acre-feet (~360 million gallons)
- Storage volume decrease at a rate of 3 acre-feet/year.



The purpose of this study was to estimate the present volume and surface area of BCR

- This information will be used to:
  - Define the impact of county development
  - Estimate storm water sedimentation effects
  - Determine if further measures are necessary to protect and maintain the installation potable water supply.

Only depth and location measurements were necessary for volume calculations.

- Depth measurements were taken with the Hawkeye Portable Sonar System

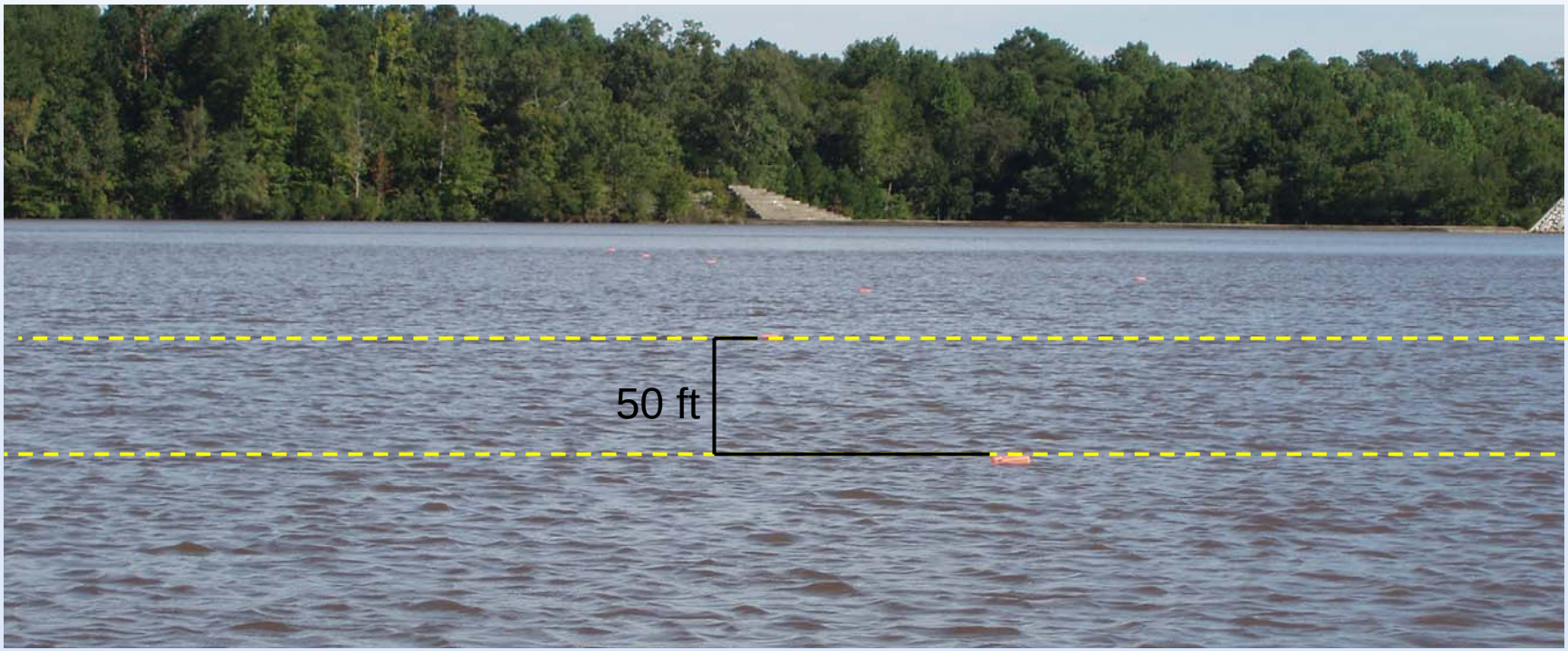
  (Depths from 0.8 – 36 meters at 0.1 meter accuracy)

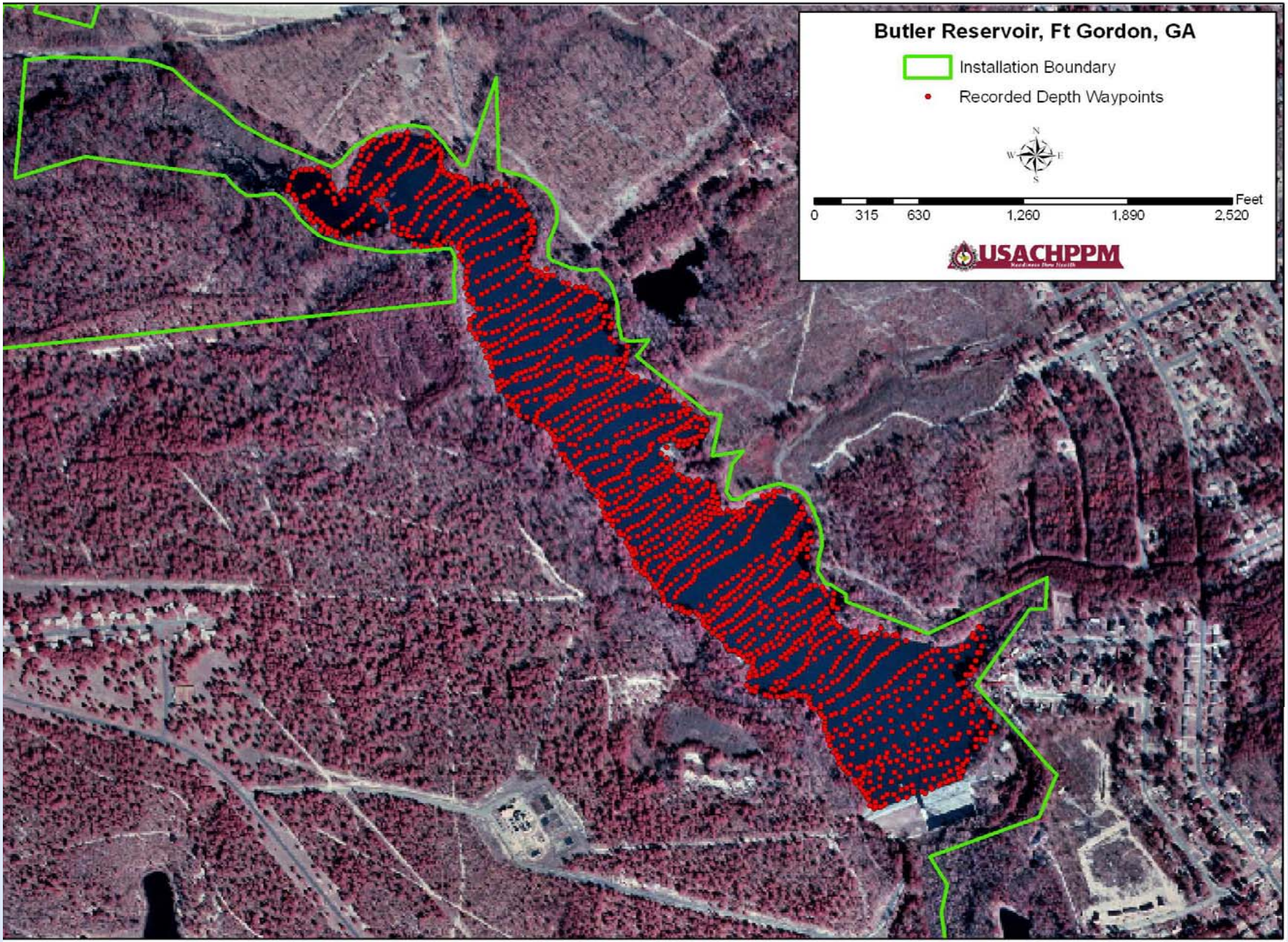
- Location of depth measurements were calculated using the eTrex™ Vista Handheld GPS

  (2-3 meter accuracy)

Surveying techniques for this study were very straightforward.

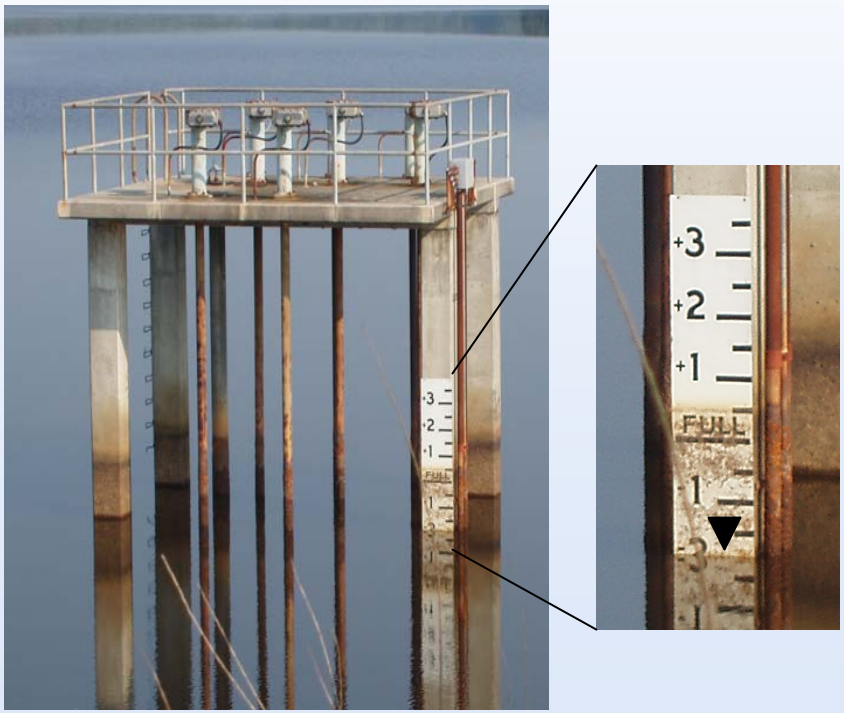
- Buoys were placed at ~50 ft intervals parallel to the dam
- Lines were sighted from shore to shore using buoys as guides
- Depth and location measurements were taken along lines




Butler Reservoir, Ft Gordon, GA
Installation Boundary
Recorded Depth Waypoints
N
W
E
S
Feet
0
315
630
1,260
1,890
2,520
USACHPPM

The BCR water level has a great potential for fluctuation

- In four weeks the volume of BCR increased by ~15%
- Increase can be attributed to hurricane precipitation



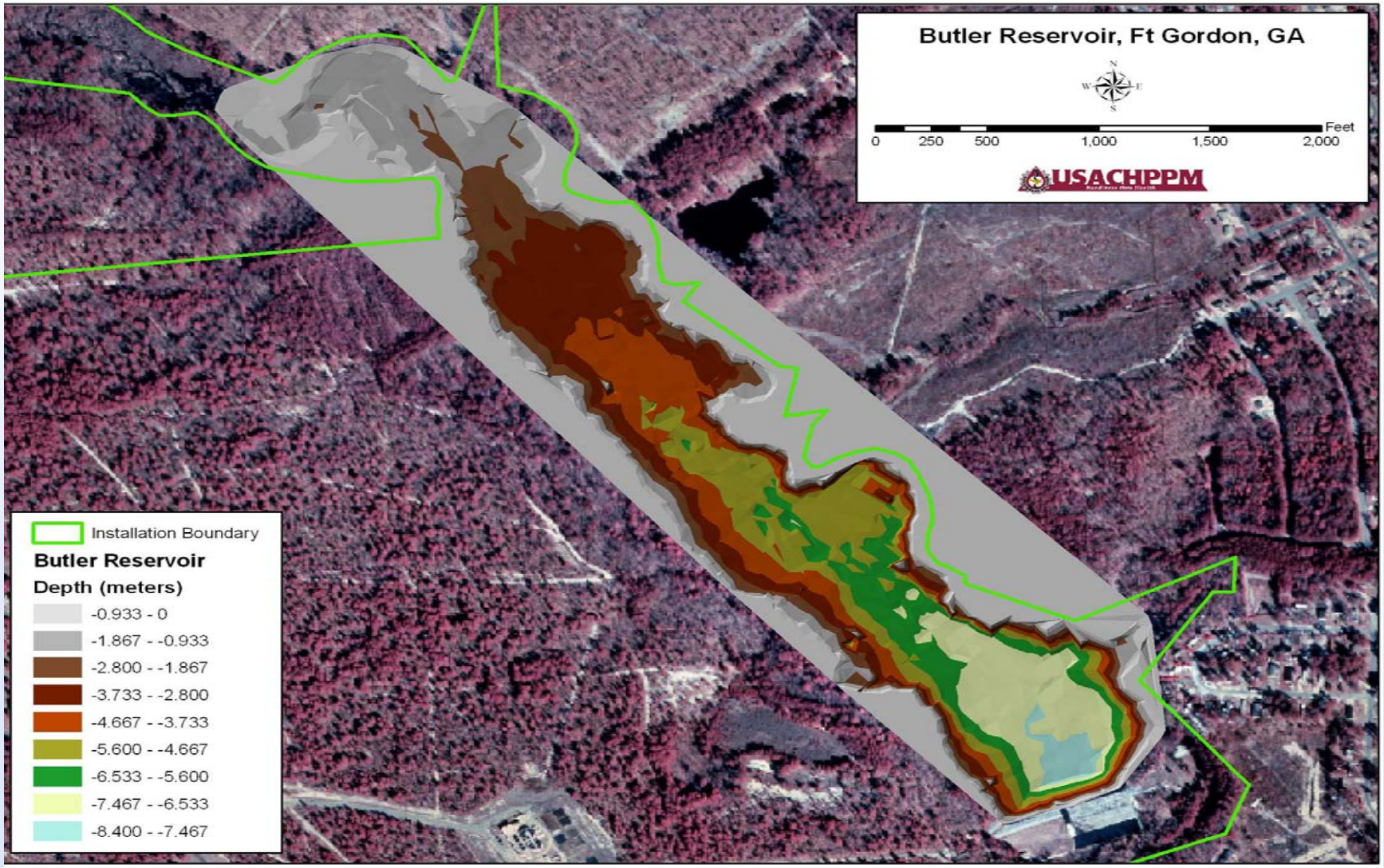
20 Aug 2004

19 Sep 2004

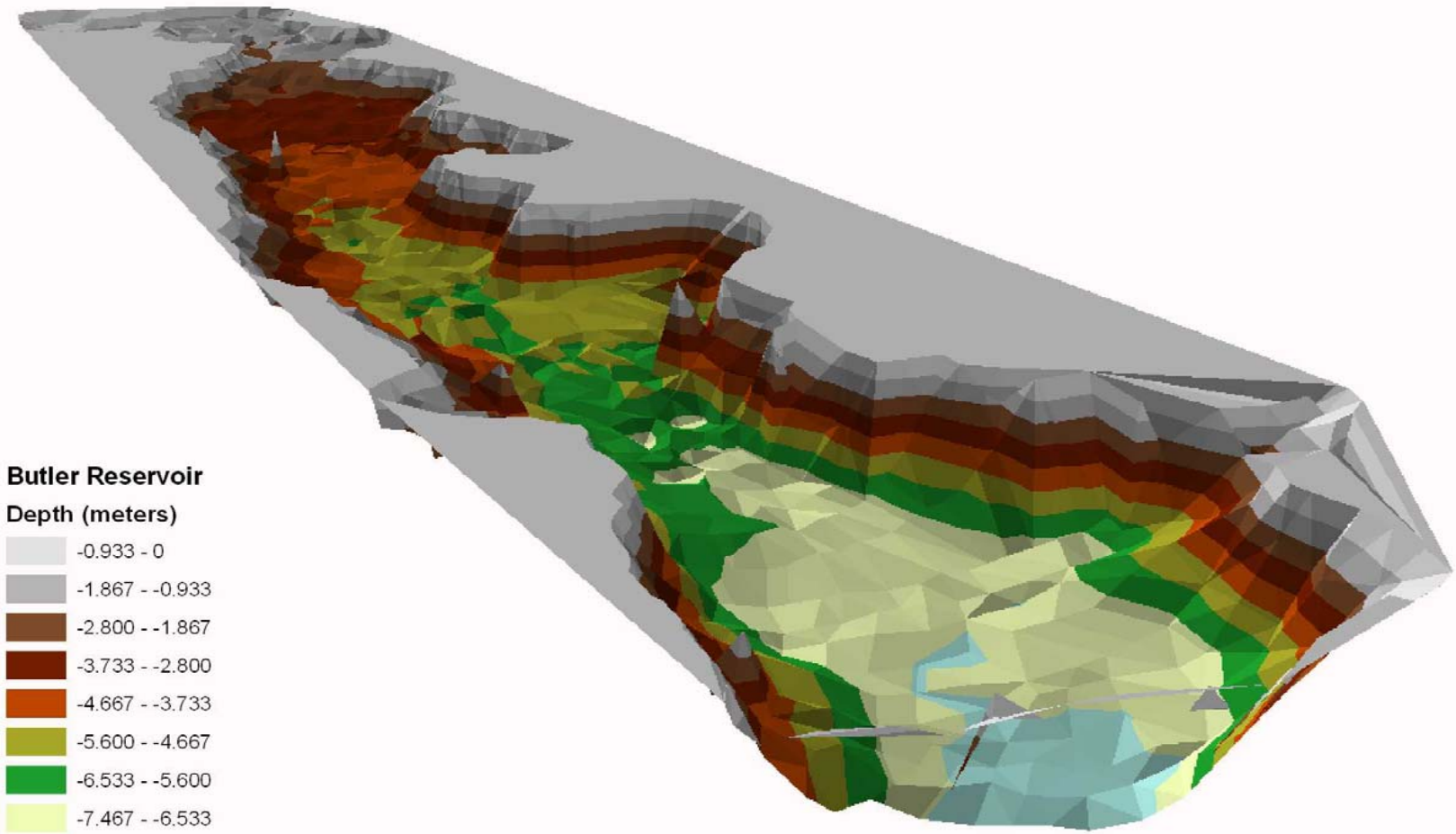
Average reservoir levels were calculated to evaluate present conditions

- BCR average level was calculated from Jan 2003 - Jan 2005.
- There was a 0.032 ft difference in the average and Sept 2004 level.
- Therefore, the Sept 2004 level can be considered characteristic of average conditions.

Using the survey data 2-D and 3-D bathymetric models were constructed.



3D Representation of Butler Reservoir
Fort Gordon, GA



USACHPPM

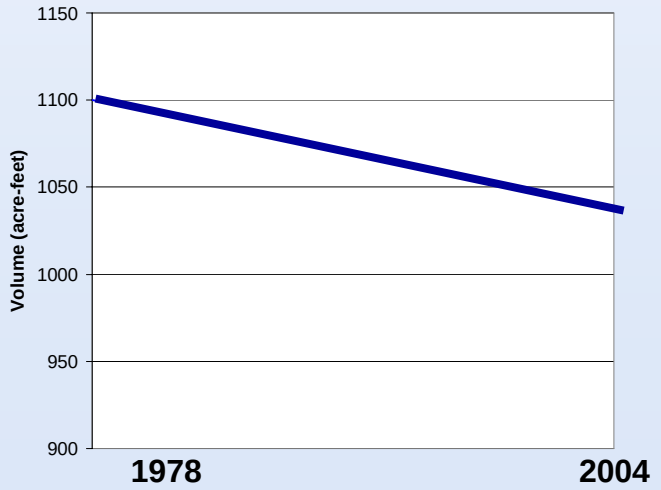
Not to scale. Vertical values exaggerated 10 times to show detail.

Overall, there was a 5.5% decrease in volume since 1978.

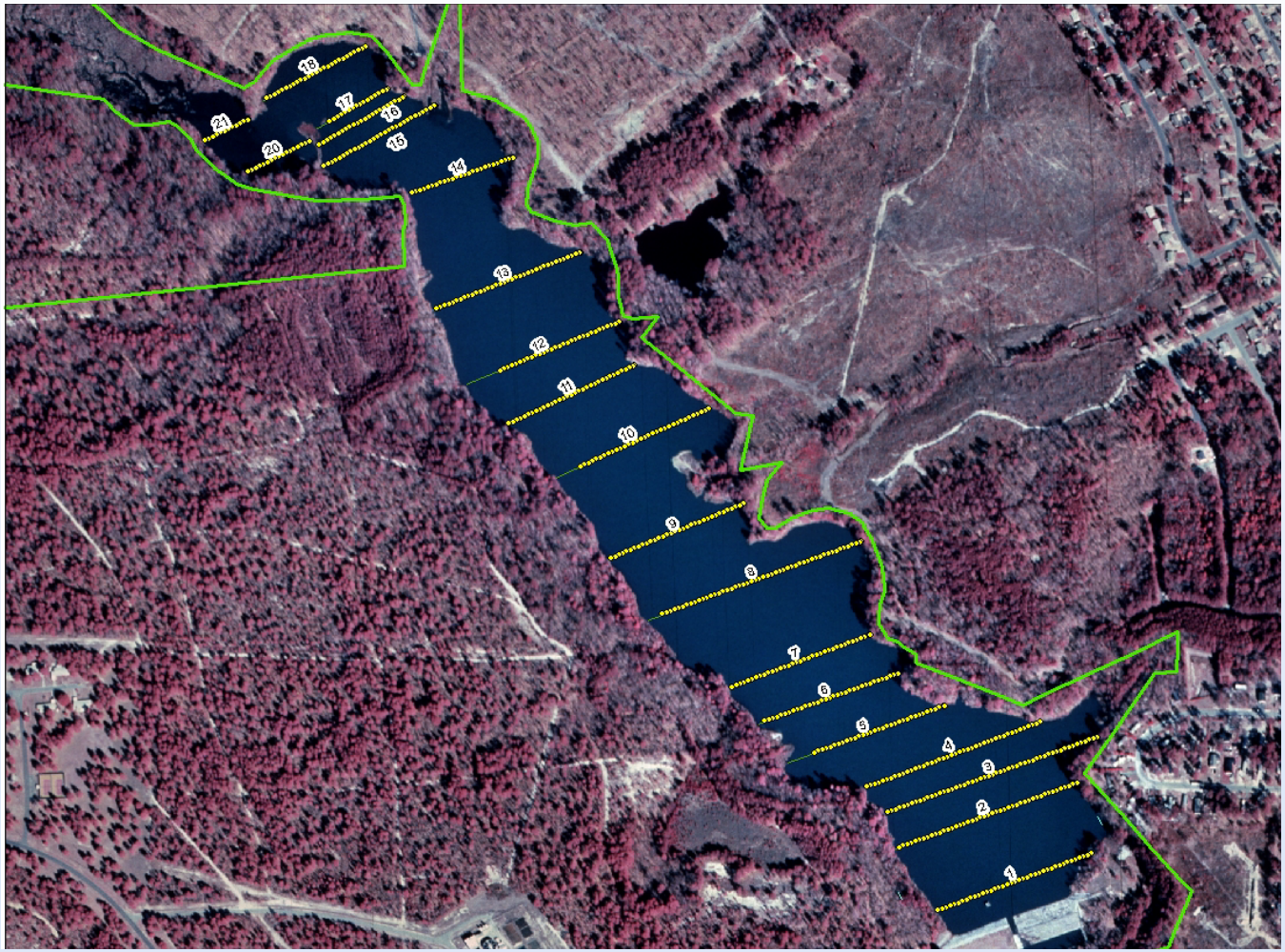
- Volume = 1039 acre-feet (339 million gallons)
- Surface area = 89 acres

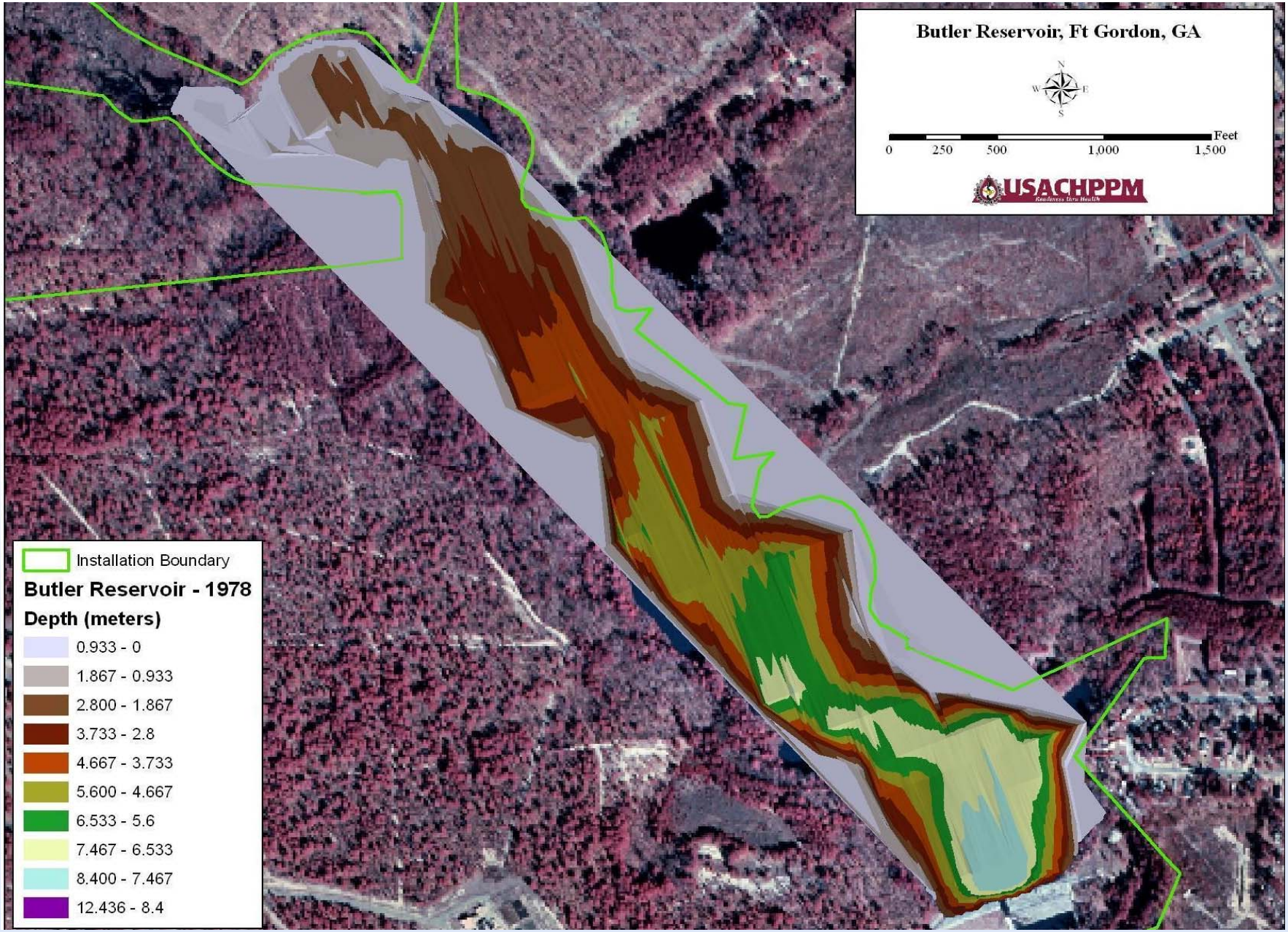
- To graphically compare the two studies a 2D bathymetric model was created from 1978 report data.

- Possible because:
  - Both studies performed in September
  - BCR was at normal pool capacity (“Full”) in 1978 and 2004



1978 bathymetric model is a best estimate due to lack of sample points.




Butler Reservoir, Ft Gordon, GA
N
W
E
S
0
250
500
1,000
1,500
Feet
USACHPPM
Installation Boundary
Butler Reservoir - 1978
Depth (meters)
0.933 - 0
1.867 - 0.933
2.800 - 1.867
3.733 - 2.8
4.667 - 3.733
5.600 - 4.667
6.533 - 5.6
7.467 - 6.533
8.400 - 7.467
12.436 - 8.4

1978

vs.

2004

Installation Boundary

Butler Reservoir

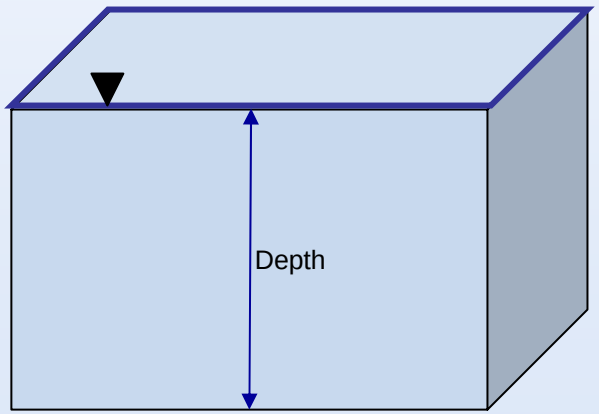
Depth (meters)

- 8.400 - 7.467
- 7.467 - 6.533
- 6.533 - 5.600
- 5.600 - 4.667
- 4.667 - 3.733
- 3.733 - 2.800
- 2.800 - 1.867
- 1.867 - 0.933
- 0.933 - 0

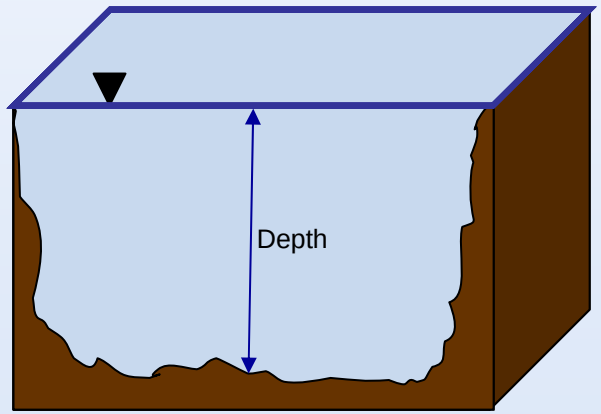
Assuming constant conditions, a decrease in volume can only be explained by a decrease in depth.

- The surface area of BCR has changed little since 1978
- The volume has decreased by 5.5%

1978



2004



Conclusions/Recommendation

- The decrease in BCR volume and capacity is the result of sediment deposition
- Regular bathymetric studies would be needed to quantify the effects of encroachment on BCR
- Repeat reservoir capacity study on a regular basis

Questions?